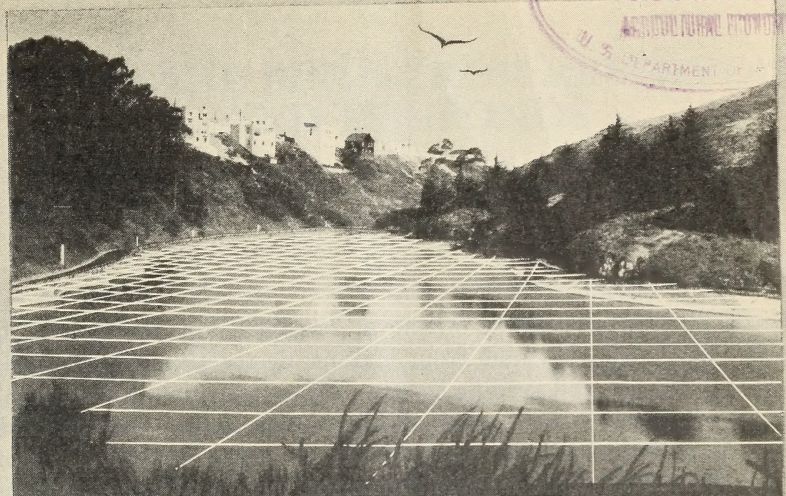

EXCLUDING BIRDS from RESERVOIRS and FISHPONDS

LEAFLET No. 120

Birds must be prevented, whenever possible, from contaminating potable water supplies and from making destructive forays among fishes in hatchery and rearing ponds. Traps and guns have usually been relied upon to accomplish this by doing away with the birds. It has been demonstrated, however, that water reservoirs not more than 1,000 feet in their longest dimension can be satisfactorily and economically protected by wiring, and small pools by screening. The wiring method can be widely extended, and it is believed that in many cases it can be practically combined with partial screening to give protection to fishponds.

There is no question of the general desirability of adopting preventive measures rather than continuing to destroy the birds. It must be kept in mind that numerous species are protected either by Federal or by State law and may not legally be killed except under permit for the control of serious damage. The suggestions herein presented are recommended chiefly as a result of observations as to their effectiveness in actual practice. By their extension our birds will receive just so much additional protection—of which they are in great need.

Washington, D. C. Issued September 1936

EXCLUDING BIRDS FROM RESERVOIRS AND FISHPONDS

By W. L. McAtee, *technical adviser and research specialist, Office of Chief of Bureau,* and S. E. Piper, formerly *associate biologist, Division of Wildlife Research, Bureau of Biological Survey*

Fish-eating birds are undesirable visitors to hatchery and other fish-rearing ponds, as are any birds to reservoirs directly drawn upon for drinking water. The reason for objection in the former case is economic; in the latter it is a matter of public health, for pollution causes a rise in the count of colon bacilli—the ordinary test of the suitability of water for human consumption. Troubles of these sorts, in some instances serious, have been experienced in various parts of the country and steps to remedy them have not always been wisely taken.

Some of the remedies applied have involved, and some still involve, destroying the birds. Since certain of these birds are protected by law, it has been necessary in special cases to maintain a system of issuing permits authorizing their killing. Objectionable features of this system are the correspondence, investigation, and delay involved, in addition to the destruction of birds that under other circumstances have an economic or esthetic worth that fully entitles them to protection. From the conservation standpoint it is certainly better to adopt measures that will prevent damage rather than at first to countenance conditions that invite trouble and then carry on some degree of warfare against the birds. It is the purpose of this leaflet to show that preventive devices can be installed at moderate cost, in some cases for less than the cost of patrolling property and killing the birds.

Water-supply Reservoirs

Birds as small as swallows, nesting about the outlet tower of a reservoir, have been known to add colon bacilli to such an extent as to make it necessary to chlorinate water otherwise perfect. When gulls, cormorants, coots, wild ducks, and other large species frequent reservoirs of purified water, pollution may rapidly assume dangerous proportions and be difficult and expensive to correct. Increase in colon bacilli, however, is not the only objectionable feature connected with the presence of birds. The oxygen content of the water is reduced by oxidation of the fecal matter and as a result there develop in it anaerobic bacteria that give the water a bad taste.

The fecal defacement of structures connected with reservoirs, while less serious, is another objection to bird occupation. Such disfiguring, however, should be controllable by preventive measures. Structures can be built in the first place so as to afford few or no perches for birds and no nesting sites. This requires a smooth exterior, without cavities or ledges, and with summits ending in sharp points

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or edges. Vertical wires sticking out of apexes and a series of them at short intervals on ridges will prevent perching. In the case of structures not originally bird-proofed, cement can be used to close, or wire mesh to cover, the openings and offsets frequented by birds.

Excluding birds from the water is a different problem, but on small reservoirs, at least, it has been solved. The successful measure, devised after trial of various others, is the installation of a system of criss-crossed, widely spaced wires covering the entire water surface (see illustration on title page). Apparently this system was devised in Victoria, British Columbia, and it has been copied with satisfaction in several cities of the Pacific Coast States. The experience of G. W. Pracy, superintendent of the city water-distribution department of San Francisco, is summarized (1927) in the following quotation:

> We . . . tried this on one of our reservoirs measuring about 200 feet square, stringing the wires 40 feet apart in both directions and found it was entirely successful in keeping the seagulls away.
>
> We next strung similar sets of wires over a larger reservoir, being circular in form and about 400 feet in diameter. This also being successful, we proceeded to string wires over our largest reservoir which is irregularly shaped, but about 1,000 feet long by 600 feet wide. In the first two reservoirs, we used the ordinary no. 9 galvanized iron wire, commonly known as telephone wire. These were fastened to 2-inch pipe driven into the ground. On the large reservoir, we felt that wires of this size would not stand the strain necessary to keep them taut over so large a span, so we first installed a system of larger cables, one-fourth and one-half inch in diameter, using these to support the small wires. Two pipe supports resting on the bottom of the reservoir and spaced about one-third of the way across were used to shorten the span.
>
> A system would have to be worked out in detail for each size and shape of reservoir, but in our case it was comparatively simple and worked perfectly. The wires are pulled taut, the network of wires being about 1 foot above the high-water mark in the low part of the span.
>
> The small reservoirs cost us about $50 for the complete job; the large reservoir cost about $400. The results have been entirely satisfactory. We get an occasional seagull, but they appear rarely and they do not stay.

Gulls, the birds most frequently complained of as polluting reservoirs, apparently are deterred from alighting on water areas protected by a simple network of wires. They will walk into a reservoir if there is a favorable margin, but are stopped by a single strand of wire strung about the edge at a height of 6 inches. In attempting to pass this barrier they take to their wings and when in flight apparently fear to try to penetrate the covering network. Occasionally individual gulls learn to alight on the water despite the wires, and these must be scared off, as they will attract others. Occasionally gulls have been reported as settling on a reservoir having wires 30 feet apart, but never as visiting one where the spacing was 20 by 22 feet. Gulls also decoy to coots or ducks that, undeterred by the wiring, may alight on a reservoir.

These waterfowl are more difficult to exclude, but where troublesome they may be controlled in part by the erection of a wire-mesh fence (18 to 36 inches high) all around the margin to prevent their walking in. Having wide shores of gravel or of concrete rather than of grass and keeping the reservoir free of aquatic vegetation also will tend to discourage the visits of these birds. Deep reservoirs are less adapted to plant growth than are shallow ones. The experiment

of installing a more closely spaced system of cross wires is also worth trying as a means of preventing coots, ducks, and other wild fowl from alighting on reservoirs. The wires certainly are a menace to birds in flight, and finding the proper spacing for each kind, so that the danger will be realized and the warning heeded, would seem to be a problem capable of solution by further experiment.

Installation of Wiring Systems

In a reservoir requiring 400– to 1,000–foot spans, every third wire of the shorter dimension should be a ¼-inch cable, as these will effectually support the cross wiring. The cables are swung from heavy timber posts set in the masonry walls. The point of attachment of the cable is 15 feet above high-water level, and the posts are reinforced by stay wires anchored to beams buried in the ground.

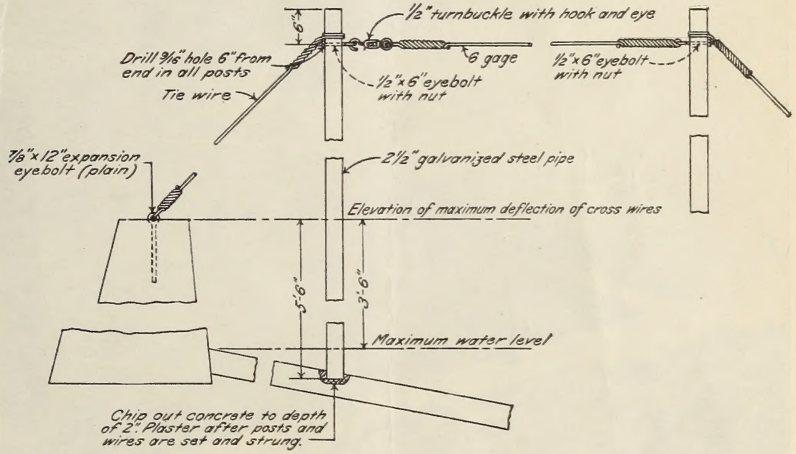

FIGURE 1.—Details of supports for long-span wires—for reservoirs about 700 feet across.

Details are given in figure 1 for the support of wires (6-gage) in a reservoir having a maximum span of 700 feet. The all-metal and concrete character of this installation makes it strong and durable. Figure 2 illustrates a simpler type of support used for shorter wires (9-gage), where a high wall was available to compensate for sagging. The posts shown are metal and are held in place by the guy wires and by the weight of the long wires they support. Similar but much larger posts are placed in the reservoir itself at intervals under the heavier cables to break the span and thus reduce the sagging. The wiring of each reservoir is an individual problem, and details as to size of wire, turnbuckles, and supports should be decided by a competent engineer.

Fishponds

Many ponds for rearing fish, especially ponds at fish hatcheries, are small and therefore would seem especially adapted to being protected by wiring. The merits of border fencing and overhead wiring may be more appreciated after considering the trouble and expense involved in the patrolling, shooting, and trapping system.

Effective work in warding off the depredations of fish-eating birds demands early rising. To catch some of the culprits in the act one must be on the scene at break of day. If such patrolling is done by hired employes, probably more than one shift will be required, with pay at a higher rate for overtime work at unusual hours. The patrolling may be necessary either throughout the warmer months or over a shorter period if fish are kept in the pond only part of the season. If guarding is necessary every day for 5 months it is obvious that a considerable bill for services will be incurred. A gun and ammunition will have to be provided as well as an outfit of traps and supports for them.

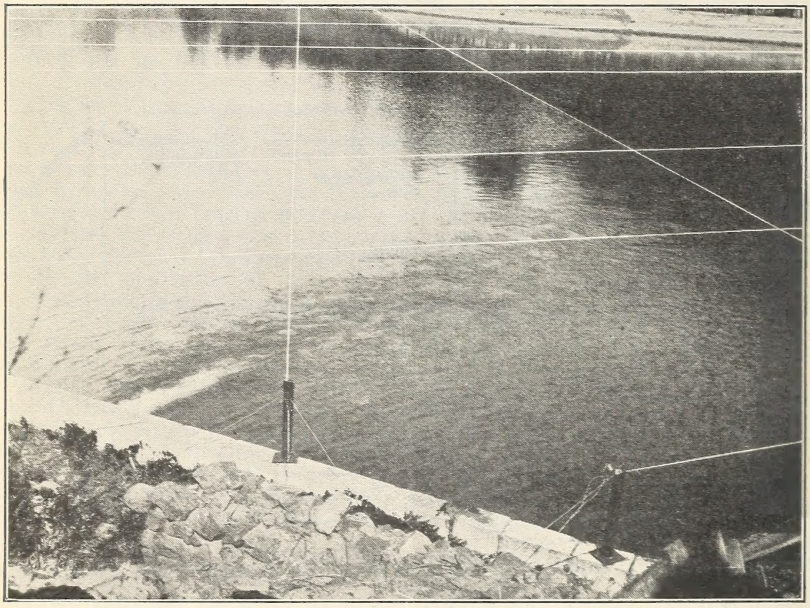

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FIGURE 2.—Supports for short-span wires.

Just what patrolling, shooting, and trapping will cost will vary with the locality, and persons faced with the necessity of guarding fishponds are in the best position to estimate the expense. It seems quite probable, however, that in general the annual cost for guarding would be more than the amount needed to screen and wire a small pond so as to make it safe from bird depredations for a period of years. Year after year additional ponds could be wired, and in time the whole number protected, so that the owner would have no further worry about predators and no expense except for the upkeep of equipment. If made of heavily galvanized material both fences and wiring should last for many years.

Edward R. Hewitt, who has had long experience in the rearing of trout and in the control of their natural enemies, has come to the conclusion that—

> The only sure way to raise trout successfully is to do it in tanks completely screened from vermin. When the trout are 9 or 10 inches long they can be raised in ponds, if they get reasonable protection from birds and other

marauders. When the large fish are put out they remain in the stream only a short time until they are caught. In this way, losses to vermin are reduced to a minimum. Therefore, the really practical way to get the most for our money and efforts is to raise the trout in completely protected areas until they are big enough to be put into the streams or grown still larger in semi-protected ponds.

A poultry-netting fence 3 or 4 feet high will suffice to stop the access of birds on the ground to a pond. The fence can be placed just on the edge of the pond (where, enclosing the minimum space, it will cost least), or it can be set back the necessary distance if margins have to be left for carrying on some of the management operations. Such a fence would be too high for even great blue herons to fish over, and if its upper edge is left without special support and the posts are pointed or tipped with an erect wire, it will not serve as a perch even for the smallest of the notable winged predators—the kingfisher.

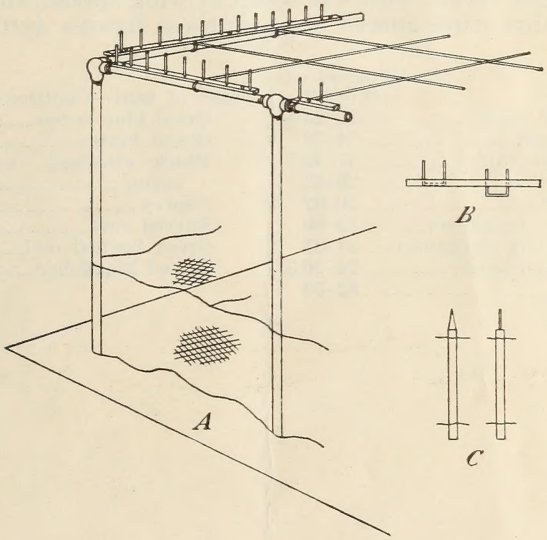

FIGURE 3.—*A*, Suggested framework to support a 3- to 4-foot poultry-netting fence and an overhead cross wiring for a small pond; *B*, wicket-shaped guard wires inserted in a wood strip for convenient installation; *C*, posts guarded against perchers by sharpening and by insertion of a guard wire.

The posts of the fence can be extended upward to any practicable height necessitated by operations in the pond and joined by a marginal frame of the same material, to which the overhead wires can be fastened. This frame should bear a series of stiff vertical wires to prevent perching, or perhaps more conveniently could be overlaid by a wooden strip through which such wires project. The choice of material for this framework will depend on the size of the enclosure and the resultant weight and pull of the cross wires. For ponds 50 feet or less in length, wood will do, but for larger ones, and in any case for stronger and more lasting service, galvanized pipe of appropriate diameter or other metal supports will be best. Consideration also should be given in some sections to the probable increase in the weight of wiring as a consequence of sleet storms. For long spans it will be necessary to brace the corner posts, and

perhaps all posts, with guy wires well anchored in the ground. Figure 3 gives suggestions for a pipe framework, fence, and cross wiring for a small pond.

The correct distance between cross wires will depend greatly on the kinds of birds it is necessary to exclude. Probably this can best be ascertained by experiment in each section. Turning back to experience with water-supply reservoirs, it would seem that very wide spacing would be satisfactory to keep out large birds in flight. It might be well to start with wide spacing and later on put in additional wires as found necessary. The accompanying tabulation shows the wing spread of several of the more common fish-eating birds that may visit small ponds. It is obvious from reference to the list that 2-foot spacing will give a network impenetrable by most if not all of these birds in flight. Whether wider interval screens would be penetrated will depend on the audacity of the various species. Where only the larger forms, with 3 to 6 feet of wing spread, threaten harm it is likely that wires spaced at twice those figures would be a sure deterrent.

Name of bird:	*Wing spread in inches*
Pied-billed grebe	22–24.5
Herring gull	54–58
Ring-billed gull	47–49.5
Forster's tern	29–32
Common tern	29–32
American merganser	34–39
Red-breasted merganser	31–35
Hooded merganser	24–26.5
Bittern	32–50

Name of bird—Continued.	*Wing spread in inches*
Great blue heron	65–74
Green heron	23–26
Black-crowned night heron	43–48
Osprey	54–72
Barred owl	40–50
Great horned owl	35–52
Belted kingfisher	21–23

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